UNITED STATES PATENT OFFICE.

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MANUFACTURE OF SACCHARINE COMPOUNDS.

SPECIFICATION forming part of Letters Patent No. 319,082, dated June 2, 1885.

Application filed August 7, 1884. (Specimens.) Patented in Belgium August 16, 1884, No. 66,048, and in France August 16, 1884, No. 163,797.

To all whom it may concern:

Be it known that I, CONSTANTIN FAHLBERG, of the city, county, and State of New York, have invented a new and useful Compound called Saccharine, and Process of Manufacturing the Same, as hereinafter fully described.

My invention relates to the manufacture of a saccharine compound from toluene and other derivatives of coal-tar, which compound contains the elements of carbon, hydrogen, oxygen, sulphur, and nitrogen, and possesses a similar sweet taste as saccharose or cane-sugar. It may be used for many purposes where sugar would be too costly—for instance, in sweetening glucose, grape or starch sugar, and for other purposes where cane-sugar is used for sweetening and preserving purposes.

The invention is based upon the original researches published by myself in the American Chemical Journal, Volume 1, Nos. 2 and 3, June, 1879, pages 170 to 175, and jointly by myself and Ira Remsen, in the same journal, Volume 1, No. 6, pages 426 to 438, in which a saccharine compound was first described, to which the name of "benzoic sulfinide" was given.

The object of this invention is to provide a process by which said saccharine compound can be manufactured on a large scale, and cheap enough to be used in the arts.

The special characteristics of the compound are its sweetness and antiseptic properties.

The high antiseptic properties of my improved saccharine compound will recommend it for many purposes in the arts and medicine. Owing to the fact that it cannot be classed under the heading of nourishments, like sugar and similar carbon hydrates, it may be used for many medical purposes in which cane-sugar is excluded from the diet, as in the case of "diabetes mellitus," and other diseases.

My improved compound does not dissolve easily in cold water. It is more soluble in warm or hot water and can be easily obtained from its aqueous solution in crystalline form. Alcohol and ether dissolve it readily. It crystallizes in thick, short prisms, in all probability belonging to the monoclinic system. The crystals, however, are small and not well formed. It fuses at about 200° centigrade under partial decomposition. Saccharine possesses a marked sweet taste, being much sweeter than cane-sugar and sweeter than grape or starch sugar. A diluted solution of the compound tastes like a saturated solution of cane-sugar.

In an aqueous solution my improved saccharine compound forms readily salt-like compounds with the alkalies, alkaline earths or metals, similar to cane-sugar. These salts possess the same pleasant sweet taste as the compound itself. All salts of the compound crystallize badly, those of the alkalies yielding on evaporation a sirup-like mass, which is unable to crystallize even after long standing.

The saccharine compound forms, under certain conditions, with the residues of the hydrocarbons, as methyl, ethyl, propyl, &c., compounds which are termed "esters," possessing the same sweet properties as the primary compound.

The saccharine compound, being a derivative of benzoic acid, does not ferment, like grape sugar and other carbon hydrates.

Having described so far the properties and advantages of my new sweet compound, to which I have given the name "saccharine," I shall now proceed to describe the process of its preparation.

Operation 1: Saccharine is prepared from coal-tar and similar products, in particular from such products containing abundantly benzine, toluene, xylem, &c. Although toluene generally is used, for economical reasons, other substitution products of benzine and the like, which yield on oxidation or which contain without previous oxidation benzoic acid, may be used. Toluene is first treated with fuming sulphuric acid in the cold, or with concentrated sulphuric acid at a temperature of 220° Fahrenheit, and above, in leaden vessels until it is dissolved, respectively converted into the two isomeric toluene-monosulphonic acids. It has been found, however, that strong concentrated sulphuric acid, or a mixture of hydrated sulphuric acid and anhydrous sulphuric acid, is better adapted for this purpose, inasmuch as the yield of saccharine was larger than when fuming sulphuric acid was used.

Operation 2: As soon as the last trace of toluene has become converted into the two toluene-monosulphonic acids the contents of the vessel are allowed to run into wooden tanks, neutralized with chalk or carbonate of lime, and filtered through a filter-press. The